

I claim:

1. A method for producing a honeycomb structure, comprising:

5 (a) providing a first sheet of deformable material stacked with a second sheet of deformable material;

(b) providing a first conveyor including:

-a first belt of interlocking rods, each said rod having a tooth, said first belt rotatable in a first direction;

10 -a second belt of interlocking rods, each said rod having a tooth, said second belt rotatable in a second direction opposite from said first direction;

-said first and second belts forming a first corridor wherein said teeth of said first belt mesh with said teeth of said second belt;

(c) providing a second conveyor including:

15 -a third belt of interlocking rods, each said rod having a tooth, said third belt rotatable in a first direction;

-a fourth belt of interlocking rods, each said rod having a tooth, said fourth belt rotatable in a second direction opposite from said first direction;

20 -said third and fourth belts forming a second corridor wherein said teeth of said third belt align with said teeth of said fourth belt;

(d) passing said first and second sheets of deformable material through said first corridor wherein said first and second sheets of deformable material are corrugated by said teeth of said first and second belts;

25 (e) separating said corrugated first sheet of deformable material from said corrugated second sheet of deformable material;

(f) applying an adhesive to said corrugated second sheet of deformable material; and,

(g) simultaneously passing said corrugated first sheet of deformable material and said corrugated second sheet of deformable material through said second corridor so that said corrugated first sheet of deformable material is joined by said adhesive to said corrugated  
30 second sheet of deformable material to form a single layer honeycomb structure.

2. The method of Claim 1, further including:

in steps (b) and (c), said teeth having a half-hexagonal shape.

5 3. The method of Claim 1, further including:

in step (b), said first conveyor including a first heated pressure plate which contacts said first belt in said first corridor, said first heated pressure plate heating said first belt and urging said first belt toward said second belt; and,

10 said first conveyor including a second heated pressure plate which contacts said second belt in said first corridor, said second heated pressure plate heating said second belt and urging said second belt toward said first belt.

4. The method of Claim 3, further including:

15 in step (b), a first friction reducing material disposed between said first heated pressure plate and said first belt; and,

a second friction reducing material disposed between said second heated pressure plate and said second belt.

5. The method of Claim 1, further including:

20 in step (c), said second conveyor including a third heated pressure plate which contacts said third belt in said second corridor, said third heated pressure plate heating said third belt and urging said third belt toward said fourth belt; and,

25 said second conveyor including a fourth heated pressure plate which contacts said fourth belt in said second corridor, said fourth heated pressure plate heating said fourth belt and urging said fourth belt toward said third belt.

6. The method of Claim 1, further including:

in step (a), said deformable material being prepreg.

7. The method of Claim 1, further including:

in step (c), said third and fourth belts each including a plurality of said rods having an indexing tooth, said indexing tooth causing said third and fourth belts to align rather than mesh.

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8. The method of Claim 7, further including:

said indexing teeth having a half-hexagonal shape.

9. The method of Claim 1, further including:

10 in step (a), said deformable material including a five layer sandwich having said first and said second sheets of said deformable material disposed between three layers of release ply; and,

prior to step (d), providing first and second rollers for feeding said first and second sheets of deformable material into said first corridor, and third, fourth and fifth rollers for feeding said release ply into said first corridor to create said five layer sandwich, wherein said 15 five layer sandwich is corrugated by said first conveyor.

10. The method of Claim 9, further including:

after step (g), providing a sixth roller which collects a central layer of said release ply 20 as said corrugated five layer sandwich exists said first corridor;

in step (e), providing a seventh roller which separates said corrugated first sheet of deformable material from said corrugated second sheet of deformable material; and,

in step (f), providing an adhesive applicator which applies said adhesive to said corrugated second sheet of deformable material.

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11. The method of Claim 10, further including;

after step (g), removing a layer of said release ply from said corrugated first sheet of deformable material, and removing a layer of said release ply from said corrugated second sheet of deformable material: and,

using a second adhesive to attach a plurality of said single layer honeycomb structures of step (g) together.

12. A method for producing a honeycomb structure, comprising:

5 (a) providing a first sheet of deformable material stacked upon a second sheet of deformable material;

(b) passing said stacked first and second sheets of deformable material through a first conveyer wherein said first and second sheets of deformable material are corrugated by said first conveyer;

10 (c) separating said first sheet of corrugated deformable material from said second sheet of deformable material as they exit said first conveyer;

(d) applying an adhesive to said second sheet of deformable material; and,

(e) passing said first and second sheets of deformable material through a second conveyer wherein said corrugated first and second sheets of deformable material are connected  
15 to form a single layer honeycomb structure.

13. The method of Claim 12, further including:

(f) applying a second adhesive to said honeycomb structure of step (e);

(g) repeating steps (a) through (e) to produce a next single layer honeycomb structure;

20 (h) applying a second adhesive to said next single layer honeycomb structure; and,

(i) placing said next single layer honeycomb structure on top of said single layer honeycomb structure so that said single layer honeycomb structure and said next single layer honeycomb structure are bound together.

25 14. The method of Claim 13, further including:

repeating steps (g) through (i) a plurality of times until a desired honeycomb structure thickness is achieved.

15. The method of Claim 12, further including:

30 steps (a) through (e) being performed as a continuous automated production process.

16. A method for producing a honeycomb structure:

(a) providing a first sheet of deformable material;

(b) providing a first conveyor including:

-a first belt of interlocking rods, each said rod having a tooth, said first belt rotatable in a first direction;

-a second belt of interlocking rods, each said rod having a tooth, said second belt rotatable in a second direction opposite from said first direction;

-said first and second belts forming a first corridor wherein said teeth of said first belt mesh with said teeth of said second belt;

(c) passing said first sheet of deformable material through said first corridor wherein said first sheet of deformable material is corrugated by said teeth of said first and second belts;

(d) providing a second sheet of deformable material;

(e) passing said second sheet of deformable material through said first corridor wherein said second sheet of deformable material is corrugated by said teeth of said first and second belts; and,

(f) connecting said first and second corrugated sheets to form a single layer honeycomb structure.

17. The method of Claim 16, further including:

in step (b), said teeth having a half-hexagonal shape.

18. The method of Claim 16, further including:

in step (b), said first conveyor including a first heated pressure plate which contacts said first belt in said first corridor, said first heated pressure plate heating said first belt and urging said first belt toward said second belt; and,

said first conveyor including a second heated pressure plate which contacts said second belt in said first corridor, said second heated pressure plate heating said second belt and urging said second belt toward said first belt.

19. The method of Claim 16, further including:

in step (b), a first friction reducing material disposed between said first heated pressure plate and said first belt; and,

5 a second friction reducing material disposed between said second heated pressure plate and said second belt.

20. The method of Claim 16, further including:

in step (a), said deformable material being prepreg.

10 21. A method for corrugating a sheet of deformable material, comprising:

(a) providing a first sheet of deformable material;

(b) providing a first conveyor including:

-a first belt of interlocking rods, each said rod having a tooth, said first belt rotatable in a first direction;

15 -a second belt of interlocking rods, each said rod having a tooth, said second belt rotatable in a second direction opposite from said first direction;

-said first and second belts forming a first corridor wherein said teeth of said first belt mesh with said teeth of said second belt; and,

(c) passing said first sheet of deformable material through said first corridor wherein  
20 said first sheet of deformable material is corrugated by said teeth of said first and second belts;

22. The method of Claim 21, further including:

in step (b), said teeth having a half-hexagonal shape.

25 23. The method of Claim 21, further including:

in step (b), said first conveyor including a first heated pressure plate which contacts said first belt in said first corridor, said first heated pressure plate heating said first belt and urging said first belt toward said second belt; and,

said first conveyor including a second heated pressure plate which contacts said second belt in said first corridor, said second heated pressure plate heating said second belt and urging said second belt toward said first belt.

5 24. The method of Claim 21, further including:

in step (b), a first friction reducing material disposed between said first heated pressure plate and said first belt; and,

a second friction reducing material disposed between said second heated pressure plate and said second belt.

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25. The method of Claim 21, further including:

in step (a), said deformable material being prepreg.

15 26. A system for producing a honeycomb structure from sheets of deformable material, said system comprising:

a first conveyor including:

-a first belt of interlocking rods, each said rod having a tooth, said first belt rotatable in a first direction;

20 -a second belt of interlocking rods, each said rod having a tooth, said second belt rotatable in a second direction opposite from said first direction;

-said first and second belts forming a first corridor wherein said teeth of said first belt mesh with said teeth of said second belt;

wherein a sheet of deformable material may be passed through said first corridor and be corrugated by said teeth of said first and second belts; and,

25 wherein a plurality of said corrugated sheets may be connected to form a honeycomb structure.

27. A system according to Claim 26, further including:

each said tooth of said first and second belts having a half-hexagonal shape.

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28. A system according to Claim 26, further including:

said first conveyor including a first heated pressure plate which contacts said first belt in said first corridor, said first heated pressure plate heating said first belt and urging said first belt toward said second belt; and,

5       said first conveyor including a second heated pressure plate which contacts said second belt in said first corridor, said second heated pressure plate heating said second belt and urging said second belt toward said first belt.

29. A system according to Claim 28, further including:

10       a first friction reducing material disposed between said first heated pressure plate and said first belt; and,

a second friction reducing material disposed between said second heated pressure plate and said second belt.

15   30. A system according to Claim 26, further including:

the deformable material including prepreg.

31. A system according to Claim 26, further including:

20       a five layer sandwich including first and second sheets of the deformable material disposed between three layers of release ply; and,

said system including first and second rollers which feed the first and second sheets of deformable material into said first corridor, and third, fourth and fifth rollers which feed the three layers of release ply into said first corridor to create said five layer sandwich, wherein said five layer sandwich is corrugated by said first conveyor.

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32. A system according to Claim 31, further including:

said system including a sixth roller which collects a central layer of the release ply as said corrugated five layer sandwich exists said first corridor;



said system including a seventh roller which separates the first sheet of deformable material and an attached layer of release ply from the second sheet of deformable material and an attached layer of release ply; and,

5       said system including an adhesive applicator which applies an adhesive to the second sheet of deformable material.

33. A system according to Claim 32, further including:

      a second conveyor including:

- 10       -a third belt of interlocking rods, each said rod having a tooth, said third belt rotatable in a first direction;
- a fourth belt of interlocking rods, each said rod having a tooth, said fourth belt rotatable in a second direction opposite from said first direction;
- said third and fourth belts forming a second corridor wherein said teeth of said third belt align with said teeth of said fourth belt;

15       wherein the corrugated first and second sheets of deformable material may be simultaneously passed through said second corridor so that said corrugated first sheet of deformable material is joined by said adhesive to said corrugated second sheet of deformable material to form a single layer honeycomb structure.

20   34. The system according to Claim 33, further including:

      said third and fourth belts each including a plurality of said rods having an indexing tooth, said indexing tooth causing said teeth of said third and fourth belts to align rather than mesh.

25   35. A system according to Claim 34, further including:

      said teeth and said indexing teeth having a half-hexagonal shape.

36. A system according to Claim 33, further including:

said second conveyor including a third heated pressure plate which contacts said third belt in said second corridor, said third heated pressure plate heating said third belt and urging said third belt toward said fourth belt; and,

5       said second conveyor including a fourth heated pressure plate which contacts said fourth belt in said second corridor, said fourth heated pressure plate heating said fourth belt and urging said fourth belt toward said third belt.